

fledgling associations of adults and offspring also have been documented in other brood-parasitic taxa, such as the Brown-headed Cowbird (*Molothrus ater*; Hahn and Fleischer 1995). Indeed, previous reports have documented male Klaas's and Diederik cuckoos provisioning both pre-volant young and multiple fledglings (Moreau 1944, Friedmann 1968, Lorenzana and Sealy 1998), thus excluding misidentification of adult females as sufficient explanation for this behavior. We speculate that not only are females sometimes misidentified as fledglings, but perhaps older fledglings being provisioned by males are sometimes mistaken for females being courted. If earlier reports were correct and provisioning of fledglings by adult males is relatively common in the African *Chrysococcyx*, it raises interesting questions about the genetic relatedness of the interacting individuals and their underlying social system.

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Widespread Cannibalism by Fledglings in a Nesting Colony of Black-crowned Night-Herons

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ABSTRACT.—I studied the diet and foraging behavior of fledgling Black-crowned Night-Herons (*Nycticorax nycticorax*) in a mixed-species nesting colony of Black-crowned Night-Herons and Snowy Egrets (*Egretta thula*) in New Orleans, Louisiana. In 1 of 5 years, cannibalism of nestlings that had fallen or climbed out of nests was common, accounting for 66 of 94 (70.2%) prey items taken by fledglings. Juveniles took younger conspecifics by both predation and scav-

enging. Isolated incidents of cannibalism among Black-crowned Night-Herons have been reported previously, but not on a colony-wide scale. *Received 2 December 2004, accepted 19 September 2005.*

Many researchers have studied the diets of adult and nestling Black-crowned Night-Herons (*Nycticorax nycticorax*; Bent 1926, Palmer 1962, Wolford and Boag 1971), but there are few data on the diet and foraging behavior of juveniles immediately after leaving the nest. Here, I provide the first report of wide-

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spread cannibalism and scavenging of conspecifics among fledglings in a nesting colony of Black-crowned Night-Herons.

METHODS

From 1 February to 18 July 2000, I monitored a colony of Black-crowned Night-Herons on Ochsner Island, Audubon Park, New Orleans, Louisiana (29° 56' N, 90° 8' W) as part of a long-term (1997–2001) study on reproductive success. Ochsner Island is a small (600 m²) island in a man-made lagoon; the distance between the island and the shore of the mainland is approximately 6 m. The island's vegetation is dominated by Chinese tallowtree (*Sapium sebiferum*) and live oak (*Quercus* spp.). In 2000, 143 pairs of Black-crowned Night-Herons and 10 pairs of Snowy Egrets (*Egretta thula*) nested on the island. Nest height ranged from 1 to 7 m above ground. I recorded the diet and foraging behavior of approximately 70 juvenile night-herons from fledging until the end of the breeding season, when the members of the nesting colony dispersed. Night-herons were considered to have fledged when they left the nest permanently and were no longer fed by adults, at which point most were capable of clumsy flight. Prey items were identified by direct observation of foraging night-herons. Observations were made from the mainland, from which approximately half of the nests in the colony could be observed. I observed foraging juveniles for 546 hr.

RESULTS

Juvenile Black-crowned Night-Herons were fed by parents until 45 ± 3 (SD) days after hatching ($n = 23$). However, juveniles were able to climb out of the nest and onto surrounding vegetation as early as 30 days after hatching, returning to the nest when a parent approached with food. At 35 days, juveniles readily left their nests, often climbing out of the nest to solicit food from a nearby parent or unrelated adult night-heron.

Juveniles remained on the island for 1–3 weeks after leaving the nest permanently, forming small groups of one to four individuals from the same nest, or neighboring nests. Each group or lone individual occupied a small (7–9 m²) territory on the ground and defended the area from passing adults and oth-

er fledglings (see Noble et al. 1938 for a full description of territoriality in juvenile night-herons). Fledglings rarely ventured into the water to hunt; rather, they spent most of their time foraging on the ground under active nests. Of 94 prey items that I saw juvenile night-herons consume, 66 (70.2%) were younger fledgling or nestling night-herons. I observed juveniles feeding on both chicks that they killed ($n = 20$) and chicks that were already dead when I began observations ($n = 46$). Other prey items included fish (10.6%), frogs (8.5%), brown rats (*Rattus norvegicus*; 4.3%), carrion dropped from active nests (3.2%), Wood Duck chicks (*Aix sponsa*; 2.1%), and a dead Snowy Egret nestling (1.1%).

Fledglings did not prey on chicks in nests or chicks perched in vegetation; they limited their attacks to nestlings on the ground that had fallen or climbed out of nests. Adults defended chicks in nests, but I never observed adults interfering with fledglings that were preying on chicks on the ground. Since older night-heron nestlings often left the nest to perch on nearby vegetation before fledging permanently, it was not always clear whether victims were nestlings that had fallen from nests or younger fledglings that had just left the nest. It is probable, however, that predation by fledgling night-herons increased mortality rates of chicks that had climbed out of the nest and would have otherwise been able to climb to safety. Older nestlings in low nests (<1.5 m above ground) often climbed out of the nest onto the ground before fledging, and were therefore more vulnerable to attacks than nestlings in high nests.

Small, weak, and moribund chicks were attacked more frequently than healthy-looking nestlings near the age of fledging. The victims were approximately 50–70% of the size of fledglings and appeared difficult to kill and consume. Fledglings killed younger conspecifics by striking them with their bills for up to 1 hr or more, and then consumed them by repeatedly striking the carcasses and laboriously tugging small pieces of meat from them.

Older fledglings were particularly skilled at preying on nestlings and appeared to focus their foraging attempts on nestlings to the exclusion of other prey. When a fledgling found an undefended nestling and began to attack it,

other fledglings usually came to fight over the victim. In one case, I observed five fledglings attack and consume a 15-day-old nestling that had fallen from its nest.

DISCUSSION

Black-crowned Night-Herons are among the most opportunistic of North American herons. They employ several different foraging behaviors (Kushlan 1976) and consume a wide variety of prey, including fish, mollusks, insects, reptiles, amphibians, rodents, birds, eggs, carrion, refuse, and plants (Hancock and Kushlan 1984, Davis 1993). Night-herons will alter their foraging methods to concentrate on locally abundant resources, including mice (Allen and Mangels 1940), fish (Spanier 1980), and amphibians (Wetmore 1920). They have also been reported to systematically exploit rookeries of other colonially nesting birds, including Common Terns (*Sterna hirundo*; Marshall 1942, Collins 1970, Shealer and Kress 1991) and Franklin's Gulls (*Larus pipixcan*; Wolford and Boag 1971). Kale (1965) reported an instance of adult night-herons in a colony preying opportunistically on White Ibis (*Eudocimus albus*) and Great Egret (*Ardea alba*) chicks from the same mixed-species rookery, noting that ibis and egret chicks from neighboring nests constituted a major food source for night-heron chicks. Published reports of night-herons feeding on conspecifics, however, are limited to Wolford and Boag's (1971) report of a night-heron nestling that was regurgitated by another nestling. Williams and Nicholson (1977) reported a suspected instance of brood reduction in the Black-crowned Night-Heron, but did not find evidence of cannibalism.

There is virtually no information on the foraging behavior of night-heron fledglings during the period immediately after they leave the nest—after the adults have stopped feeding them but before they become adept at catching their own prey. Lorenz (1938) and Palmer (1962) reported that fledglings move through the colony and are able to beg food from any adult; however, Finley (1906) and Noble et al. (1938) found that adults do not feed juveniles on the ground. Data on the composition of fledgling diet are scarce, possibly because recently fledged juveniles may forage at night (Rockwell 1910, Davis 1993). In this study, I

found that juveniles sometimes climbed back to the nest in the first 2–3 days after fledging, and were usually fed by the parents. After 3 days post-fledging, fledglings on the ground often grabbed the bills of passing adults in an attempt to stimulate them to regurgitate food, but were almost always unsuccessful.

Fledglings also seemed unable to fish efficiently in the deep water surrounding the island, at least for the first 7 or 8 days after fledging. I frequently observed fledglings in the water striking at floating sticks and pieces of leaves, but they rarely captured live prey. Fledglings occasionally picked up prey dropped by nestlings in active nests; on one occasion, a fledgling climbed into a low nest and pulled a fish from the bill of the fledgling to which it had just been delivered. Adults, by contrast, were never observed feeding on dead nestlings or other carrion, suggesting that they were more skilled at catching higher-quality, live prey.

Although I spent similar amounts of time observing the same rookery each year (1997–2001), cannibalism among Black-crowned Night-Heron fledglings was prevalent only in 2000. I observed night-heron fledglings feeding on dead night-heron and egret chicks only twice in 1998 and once in 2001. The species composition of the nesting colony was fairly constant across years, comprising 120–150 pairs of Black-crowned Night-Herons and 5–10 pairs of Great Egrets and Snowy Egrets; thus, the level of competition for food among fledglings on the island should not have been elevated in 2000. In other years, fledgling diets were dominated by fish and frogs. However, it is difficult to compare prey composition across years because I observed far fewer prey captures in other years, possibly because juvenile Black-crowned Night-Herons may forage mostly at night.

It is possible that cannibalism rates were exceptionally high in 2000 because local shortages of fish or other live prey forced fledglings to seek alternate food resources, but I was unable to document such a shortage. A food shortage would have affected the diet and foraging patterns of fledglings more than adults and nestlings, since adults often left the nesting colony to forage while fledglings remained on the island.

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First Report of Black Terns Breeding on a Coastal Barrier Island

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ABSTRACT.—Black Terns (*Chlidonias niger surinamensis*) breed locally in freshwater wetlands across the northern United States and central Canada, often building their nests over shallow water on a floating substrate of matted marsh vegetation. Here, we report the first nesting record of this species on a coastal barrier island. The nest, which consisted of two eggs laid in a slight scrape of sand, was located on 6 July 2004 in a large breeding colony of Common Terns (*Sterna hirundo*) on Kelly's Island at Kouchibouguac National Park, New Brunswick, Canada. The observation also represents the current northeastern breeding limit for this species in North America. Both eggs hatched, but

neither chick survived beyond 4 days. Received 15 December 2004, accepted 5 October 2005.

The North American subspecies of Black Tern (*Chlidonias niger surinamensis*) breeds locally across the northern United States and central Canada. Black Terns are semicolonial, typically nesting in productive, shallow freshwater marshes, semipermanent ponds, prairie sloughs, and along margins of lakes and rivers (Stewart and Kantrud 1984, Dunn and Agro 1995, Schummer and Eddleman 2003). Nests are generally placed in areas of calm water within stands of emergent bulrush (*Scirpus* spp.), cattail (*Typha* spp.), bur-reed (*Sparganium* spp.), or pickerelweed (*Pontederia cordata*; Cuthbert 1954, Dunn 1979, Mazzocchi et

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